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Service Manual

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ORION

COLOR TELEVISION RECEIVER

TV 575 TX

Chassis A4GS

Bestell-Nr. :

7271

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1.0 SAFETY AND ISOLATION

Under no circumstances should any form of repair or maintenance be attempted by any person other than a competent technician or engineer. Most of the circuitry is isolated from the mains by T801, C811, R819, R820 and 6mm air gaps. To maintain this safety factor ensure that, after repair, any gaps or leakage paths are not reduced by protruding wires, etc., following component replacement.

NOTE: Although the output supply paths from the power supply section are isolated from the incoming mains supply, the bridge rectifier, the control and regulation circuits are not isolated. Therefore, when servicing the power supply section of the chassis, the mains input should be connected via an isolating transformer of at least 200 watts rating.

The power supply section remains charged with respect to chassis for 30-60 seconds after switching off. Care should be taken to avoid touching the power supply area of the chassis during this time.

Components marked on the parts list are safety approved types and should be replaced only with components supplied or approved by Tatung Service Department. It is also recommended that components not marked with the safety symbol should be replaced with parts of the type originally fitted. This applies particularly to those resistors which 'stand off' the printed circuit boards.

1.1 HANDLING PRECAUTIONS - Static Electrical Charges

The receiver contains devices which may be damaged by static electrical charges during handling. To avoid damage, soldering irons should be earthed, and personnel should wear wrist straps earthed via a 1M Ω resistor. If the latter is not practical, they should discharge themselves by touching an earthed point.

Static sensitive devices should be packed in suitable conductive containers.

IMPORTANT: although the receiver chassis is isolated, the mains supply should be disconnected during service replacement of such static devices.

2.0 SWITCHED MODE POWER SUPPLY

2.1 Circuit Description

The self-oscillating switched converter circuit centres around IC801 (TDA4605) which provides all the necessary control and protection functions. The operating frequency varies in the range 20-70kHz, depending upon the load conditions.

IC801 controls the MOS power transistor (TR801) which switches T801 primary winding across the rectified mains voltage stored in the reservoir capacitor (CE807). AC output voltages transformed to the secondaries are rectified and smoothed, by separate diode/capacitor networks, to produce DC voltage rails of 9v, 18v, 28v and 115v.

The TR801 drive from pin 5 of IC801 maintains constant secondary winding voltages regardless of input or load changes. A control voltage, derived from a T801 winding, is rectified and smoothed by D807/CE817. The attenuated control voltage is applied to IC801 pin 1 and is used to match pin 5 output pulse frequency to secondary load conditions. R805 and C809 provide pin 2 of IC801 with a voltage proportional to TR801 drain current. This is used in the IC to control the pulse duty factor at pin 5.

RV817 (SET HT) adjusts the proportion of the control voltage fed to pin 1 of IC801 and thereby adjusts the output voltage.

The AC control voltage from T801 is attenuated by R810 and fed to pin 8 of IC801. At pin 8 the zero passage detector senses a zero crossing and so enables the control logic. This ensures that drive pulses to TR801 are timed correctly.

The supply to pin 6 of IC801 is developed by D806 and CE816 from the same winding on T801 that produced the control signal. Start-up voltage is provided via R811 and R812 from rectified mains.

2.2 Voltage Adjustment

With the receiver locked to a normal picture signal, reduce the brightness and contrast to minimum, i.e. zero beam current. Connect a suitable voltmeter across CE818 and adjust RV817 for a reading of 115v dc.

2.3 Voltage Measurements

Use a digital voltmeter (D.V.M.)

IMPORTANT: All S.M.P.S. voltages on IC801 are measured relative to pin 4 on the IC, NOT relative to the chassis. Pin 4 is approximately -160v relative to the chassis.

Integrated Circuit IC801 (TDA4605)

Pin	Voltage, V dc	Pin	Voltage, V dc
1	0.4	5	2.0
2	1.2	6	12.0
3	1.8	7	3.1
4	0	8	0.42

3.0 TUNER AND IF AMPLIFIERS

3.1 Tuner

The main chassis is fitted with a UHF (System I) tuner TU001. Tuning is achieved by a microprocessor controlled Frequency Synthesis tuning system communicating with the tuner via the IIC bus. A stable 33V tuning control voltage is provided by IC001 (BZX55B33V) the regulator Zener diode, which is supplied from the 115V HT supply. For most aerial input signal levels the tuner operates at full gain. At high signal levels the gain of the tuner is reduced by an AGC voltage generated in IC011. The output at pin 4 of IC011 is applied to the RF amplifiers in the tuner via pin 1, PL001.

3.2 IF Amplifier & Vision Demodulator

The IF signal from the tuner connects via PL002 to the SAW filter (FL011) which determines the major bandpass characteristics of the IF amplifier. The output of FL011 is fed symmetrically to pins 1 and 2 of IC011 (TDA 8349A)

IC011 amplifies the IF signal before demodulation takes place in the IC, after demodulation the composite video signal is amplified within IC011 and emerges at pin 13.

When tuned to the vision carrier frequency, L011 and its associated network provide a reference vision carrier which is used by the synchronous video demodulator and the AFC demodulator.

The AFC section of IC011 consists of an AFC demodulator with internally gated sample and hold buffer amplifier followed by a digital logic network with two outputs, IC011 pins 8 and 9. Pin 9 is a "High/Low tuning" signal and Pin 8 is a "within tuning window" signal. The digital AFC output signals from IC011 pins 8 and 9 are fed via PL002 pins 6 and 7 to the tuning microprocessor. Also incorporated in this IC is a video recognition circuit which gives a Vision Ident signal output on IC011 pin 18.

The video component of the demodulated signal is separated from the intercarrier sound component by the 6MHz rejector FL614.

3.3 Sound Demodulator

The sound IF is taken from the saw filter FL011 to IC611 (TDA4482), a dual IF demodulator.

Only one demodulator within the TDA4482 is used. L612 is adjusted such that L612, C614 and R619 tune the required sound carrier offset frequency, 6.0MHz for system I.

The NICAM IF signal appears on pin 5 of IC611, which is buffered (TR611) and fed to the NICAM decoder via pin 8 of PL001.

3.4 Adjustments - Vision

- a) Tuner IF AGC - With 10 mV RF signal (no sound carrier) applied, monitor the tuner output with an oscilloscope having a bandwidth equal to or greater than 50MHz and adjust RV018 for 1.2V pk-pk signal.
- b) AFC/Detector Coil Alignment - remove any connection to the aerial input socket and ensure that the receiver is not tuned to a strong transmission, Inject a 100mV IF carrier signal (39.06MHz) into the input of the SAW filter.

With a double beam oscilloscope monitor the logic levels on PL002 pin 6 (On Tune Window) and pin 7 (High/Low Tuning), adjust L011 to give pin 6 logic high and pin 7 near to the high/low transition in the centre of the On Tune Window.

NOTE: there may be more than one tuning point which will give these conditions. The correct point will give rapid changes for a small adjustment. The incorrect points will give relatively slow changes with adjustment.

3.5 Adjustments - Sound

Inject a signal with a 6.0MHz offset sound carrier modulated at 1kHz at a deviation of 27kHz. Adjust L612 for maximum recovered audio with minimum distortion on pin 11 of PL001.

4.0 SYNC PROCESSING AND TIMEBASE GENERATORS

4.1 Description.

The line and field timebases are based around IC401 TDA2579A for synchronization, IC402 TDA3653B for field scan and a discrete line stage for line scan.

4.2 Synchronization.

Composite video is fed to pin 5 of IC401, line flyback reference to pin 12 and field feedback to pin 2. Horizontal and vertical sync separation is performed on the incoming video signal by pins 6 and 7 with the slice level determined by R407. The slice level is independent of sync pulse amplitude.

4.3 Line Timebase.

The horizontal oscillator is connected to pin 15 of IC401 and the frequency set by C412, R411 and RV412 with the latter providing frequency adjustment. Horizontal drive appears at pin 11. If no flyback pulse is present at pin 12 then the duty time of the line drive output at pin 11 is set to 50% and the second phase locked loop on pin 14 is not closed. Line phase adjustment is performed by forcing a charge or discharge current on pin 14. The picture centring is adjusted by RV403 with transistors TR407, TR408 and associated components maintaining consistent picture centring in external RGB and teletext modes.

Pin 13, the ident line, is high when IC401 has detected a valid sync signal.

In search tuning modes when noise may appear on pin 5 of IC401, the input signal may be 'muted' by TR403 so as to provide a stable on screen display.

Time constant switching for AV modes is automatic, however, a fast time constant is forced in teletext mode by TR404 and R421 on pin 18.

4.4 Vertical Timebase.

The vertical sawtooth at pin 3 of IC401 is generated by a synchronized divider internal to the IC. This results in no field frequency adjustment being necessary. An internal comparator compares the sawtooth with the vertical feedback at pin 2 which has been derived from the bottom of the field scan coils at R441. This then generates a ramp voltage which is used to drive the field output integrated circuit IC402.

4.5 Timebase adjustments.

- a). Line Frequency - With an aerial signal of 3-10mV short out pin 5 of IC401 to 0V. Adjust RV412 for a stable, or as slow rolling as possible, picture on screen
- b). Line width and phase - Adjust L407 for correct line linearity and width and RV403 for correct centring.
- c). Field height and shift - Adjust RV416 for correct picture height and RV444 for correct centring.

5.0 LINE SCAN AND EHT

5.1 Line Scan.

The horizontal drive output from pin 11 of IC401 is fed to the Darlington configuration of TR401 and TR402 which form the line driver. T401 is a transformer to provide a low impedance base drive to the line output transistor TR403.

Line output is of the conventional energy recovery type with the deflection coils tuned during flyback by C420. 'S' correction is provided by C423.

The diode split transformer T402 is driven from T401 with a tap on the primary winding generating 210V for the video output amplifiers which is rectified by D403.

Secondary windings develop the heater supply and line flyback reference. A further secondary winding generates the field output amplifier supply of 23V via D404.

5.2 EHT.

The 24kV nominal supply to the picture tube is produced by T402 by a 3-section diode split overwind. The leakage inductance of T402 and the winding capacitance are tuned to line flyback harmonics to ensure good EHT regulation.

Adjustable A1 and focus are provided by a thick film resistor network across part of the overwind.

5.3 Beam Current Limiting.

Current flowing through R434 reflects the beam current information and so the voltage at the junction of R434 and C426 changes in response to changes in beam current. This voltage is passed to IC552 pin 28 and the beam limiting effect on the contrast level out of IC552 is activated when the voltage on pin 28 falls to under 4.2V which corresponds to approximately 3V on the junction of R434 and C426 when D551 can conduct. This corresponds to a beam current of around 800mA.

6.0 Field Scan

Field scan is performed by IC402 TDA3653B whose 23V rail is generated from the line scan output circuit.

The field drive ramp from IC401 pin 1 is fed via R418 to pins 1 and 3 of IC402. The scan current output at IC402 pin 5 is fed to the field scan coils. This is sampled by R441 with the resulting voltage fed back to IC401 pin 2 as described in 4.4

The field height is controlled by RV416.

High frequency stability is controlled by C427, C428 and vertical linearity by R419 R438 and CE435.

IC402 is equipped with a flyback generator. During scan the 23V supply is applied to pin 6 via D401. During flyback the voltage is transferred through C432 to pin 8 causing the voltage to double. This results in a rapid flyback as the scan coil field collapses until the voltage across the scan coils falls below 23V and so pin 8 goes low voltage again and the cycle repeats itself.

7.0 VIDEO PROCESSING CIRCUITS

7.1 The TDA8453A Luma/Chroma separator and video switch is IC501.

Composite Video signals from the IF circuits at IC501 pin 18 and from the SCART socket at IC501 pin 16 are selected using the Video Source Select pins at IC501 pins 5 and 7, and are controlled by IC552 pin 39 which is in turn controlled via the I²C bus.

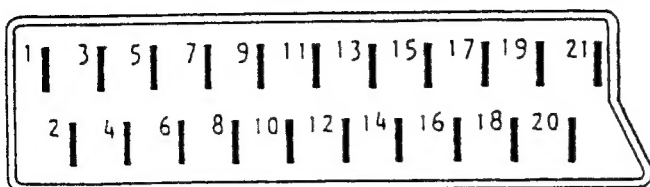
The separated Chroma signal at IC501 pin 8 is fed to IC552 pin 40. The separated Luma signal at pin 6 of IC501 is fed to pin 29 of IC552. A delayed Composite Video signal at pin 4 of IC501 is fed via a X2 amplifier TR502 and TR504 and via the Video Sync Select switch IC502 and the teletext board to the Sync Generator, pin 5 of IC401.

7.2 The TDA8466 PAL/NTSC Colour Decoder controlled by the I²C Bus is IC552.

Colour Difference signals -(R-Y) and -(B-Y) at pins 36 and 37 of IC552 respectively are fed to pins 9 and 12 of IC551 respectively. IC551 is a TDA8451A Dual Channel Delay Line. The delay is determined by the frequency of the Sandcastle Pulse that is generated by IC401 and applied to pin 15 of IC551. The delayed -(R-Y) and -(B-Y) Colour Difference signals at pins 10 and 11 of IC551 respectively are fed via LK552 and LK553 to pins 25 and 26 of IC552 respectively. IC552 uses an internal matrix to recover RGB signals from the Colour Difference signals and the Luma signal.

Direct SCART RGB signals are fed to pins 30, 31 and 32 of IC552 respectively. Direct SCART RGB is selected by switching pin 1 of IC552, SCART RGB Select line.

Teletext (TXT) or On Screen Display (OSD) RGB signals are fed to pins 19, 22 and 23 of IC552 respectively. TXT or OSD RGB is selected by switching pin 13 of IC552 TXT/OSD Select line. The selected IF/SCART Recovered RGB, Direct SCART RGB or Direct TXT/OSD RGB appears at pins 18, 21 and 20 of IC552 respectively, from where it is fed to the Tubebase via PL551.



SCART Connections

Pin Description

1	Audio output Right	0.5Vrms @ 1k Ω
2	Audio input Right	0.5Vrms @ 10k
3	Audio output	0.5Vrms @ 1k Ω
4	Audio return (0V)	
5	Blue return (0V)	
6	Audio input Left	0.5Vrms @ 10k
7	Blue input	0.7Vpp @ 75 Ω
8	Function switch	9.5 - 12Vdc @ 10k
9	Green return (0V)	
10	No connection	
11	Green input	0.7Vpp @ 75 Ω
12	No connection	
13	Red/SVHS1* Chroma return (0V)	
14	No connection	
15	Red/SVHS1* Chroma input	0.7Vpp (Red)/0.3Vpp burst (SVHS) @ 75 Ω
16	RGB blanking	1 - 3Vdc @ 75 Ω
17	Video return (0V)	
18	Video return (0V)	
19	Video output	1Vpp @ 75 Ω
20	Video/SVHS1* Luma input	1Vpp @ 75 Ω
21	Shield (0V)	

* SVHS1 Mode.

8.0 PICTURE TUBE BASE PANEL

8.1 Description

The panel fitted to the Picture Tube base includes the supplies to the tube electrodes with their associated components for circuit protection. Internal Spark Gaps are constructed in the Tube Socket for connection to the tube external Dag Coating. Also included on the panel are the Video Amplifiers TR901, TR902 and TR903, and their preset adjustments. The Focus and A1 supplies are fed from a thick film resistance module embodied in the Diode Split Transformer.

8.2 ADJUSTMENTS

(R, G and B Backgrounds) - Reduce the A1 control to zero. Adjust the user Brightness and Contrast controls for normalized settings with Colour at minimum.

Adjust R937, R938 and R939 so that the Black Level measured at each CRT cathode (R933, R934 and R935) is +160V.

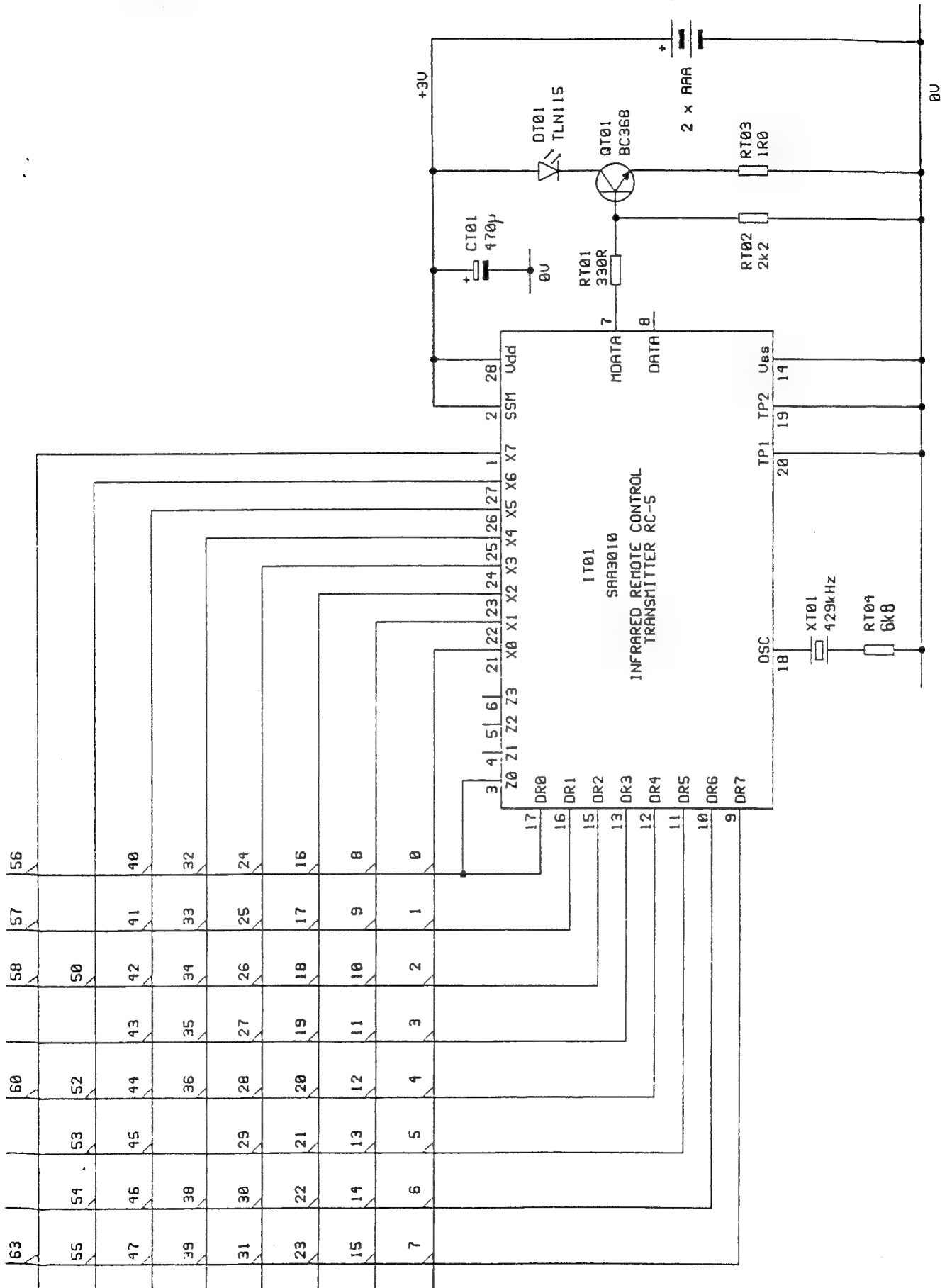
Increase the A1 control for correct overall Black Level on the display. Grey-scale corrections may now be carried out with only two of the presets.

9.0 The A-Series Remote Control.

The infra-red transmitter consists of a single IC which contains all the circuitry required to scan the keypad and produce a series of pulses to drive the infra-red transmitting diode. The command generated by the IC is a RC-5 encoded sequence. This sequence is a bi-phase transmission based upon a 1.79ms bit time. The carrier frequency of the transmission is 36.0kHz. The transmission consists of 14 bit times, the first two being a logic '1' the third being the toggle bit, this changes state every new command. The next 5 bits correspond to the system address which is always 00000. The remainder are the six bit command data.

The coded infra-red signals are detected within the receiver module, IC704. This module includes the receiver, pre-amplifier and pulse shaper circuits required to drive the microprocessor infra-red input, (IC701 pin 47). The pulse output of IC704 is normally high, (>4.9V), and goes low when an infra-red pulse is received. This output of IC704 is inverted by TR701 prior to being presented to IC701.

A-Series Remote Control Circuit Diagram



10.0 Microprocessor Control System

10.1 Main Microcontroller IC701, P83CL168

IC701 is a microcontroller used to control the receiver. Because many of the devices within the receiver are bus controlled, the system relies heavily upon a communications interface. This interface is the IIC bus, a two wire bus consisting of a clock (pin 4 of IC701) and data (pin 6 of IC701) line.

10.2 Local Controls

The local controls consist of 8 keys:- volume up, volume down, programme up, programme down, store, clear, search and function select. The volume up and down buttons work in conjunction with the function select button. Their default function is to control the volume. The function select button will select alternative parameters to change. The store and clear buttons are used to respectively store and clear tuning / preference settings. The search button activates the search tuning function.

10.3 On Screen Display

The OSD is also controlled by IC701. The outputs of IC701, (pins 58 - 61), are active high and are routed to the decoder via a switch on the teletext board. IC701 requires active low TTL compatible horizontal (pin 56) and vertical (pin 55) sync signals to synchronize its output. OSD oscillator frequency is determined by C709, R708/link and R710.

10.4 Off Screen Display

IC701 drives red LED D711 (pin 17) to signify standby and IR command received, and indicates a NICAM transmission is currently being received by driving yellow LED, D714 (pin 22).

10.5 Tuning Control

Tuning is controlled via the IIC bus from IC701. Tuning is frequency synthesis and has the capability to cover a tuning range of 45MHz to 860MHz. AFC information is digital and is input to IC701 via pins 16 (high/low) and 15 (window ident).

10.6 Hidden Service Mode and Service Parameters

Service mode is entered by grounding pin 40 of IC701. This enables the setting up of parameters internal to the decoder. Buttons 2 and 3 of the hand unit control which parameter is currently adjustable. Balance buttons L and R control the current parameter value.

Parameter	Function	Adjustment
00	Peak White Limit Value	00 - 3F Factory preset to 3F
01	Red gain	00 - 3F
02	Green gain	00 - 3F
03	Blue gain	00 - 3F
04	Beam Limit Mode	00 - 03 Factory preset to 01

10.7 Teletext

The teletext decoding and display is performed by a single IC - IC301. This IC performs the data capture, sync regeneration, timing and memory control required to produce a four page decoder. 1Vpp video is input on pin 8. The IC switches its sync output (pin 12) between the incoming video (PIC and MIX modes) and its internal sync generator (TEXT mode). The sync output is routed via a x2 amplifier before being routed to the sync processor at 0.6V sync amplitude, (2Vpp video). Contrast of the RGB outputs on pins 15, 16 and 17 is controlled by the resistor network on pin 18. Pins 26 - 48 control the 64k bit static ram (IC302) needed to store the teletext pages.

IC303 is a RGB switching IC. It switches between the RGB and blanking from the OSD and the RGB and blanking from the teletext IC. OSD RGB has priority over teletext. It requires 0.35Vpp RGB input signals to generate 0.7Vpp on its outputs which go to the decoder IC.

11.0 NICAM Decoder PWB.

11.1 NICAM Carrier Specification

Bandwidth approximately 700KHz (-30dB)

Spacing from vision carrier 6.552MHz.

Coding DQPSK, (Differential Quadrature Phase Shift Keying).

11.2 Signal Path

11.2.1 Bandpass filter FL6101 (Toko)

From IF the QPSK signal is filtered to remove the FM standard audio signal.

11.2.2 NICAM Demodulator IC6101 (NIDEM TDA8732)

The NIDEM IC converts each of the four phases of the incoming QPSK signal into two bits of parallel data. The data is then converted to serial format and clocked out to the NICAM Decoder IC.

11.2.3 NICAM Decoder IC6102 (TDSD SAA7282)

The NICAM Decoder is synchronized to the Frame Alignment Word of the incoming digital signal. The decoder de-scrambles the data and identifies the transmission mode (stereo, dual, mono, data). The Digitized Audio is then passed through a three times over-sampler to effectively treble the DAC frequency, reducing the amount of analogue filtering required. The output from the DAC is passed through a third order filter and amplified before being routed via audio switching to the power amplifiers.

External FM audio is switched internally with the NICAM audio in IC6102 via the I²C bus. FM audio is input via pins 14 and 21.

11.3 Audio Control and Power Amplifier

The audio control and power amplifier panel is based on two IC's; IC6301, the volume/tone control IC, TDA8425 and IC6303, the power amplifier IC, TA8211AH.

Power is supplied from the main panel to PL6303. The 12V regulator IC6302 supplies IC6301 from the 18V rail. The 28V rail supplies IC6303. Supply smoothing/decoupling capacitors are CE6313, C6312, C6308 and CE6311. *Note: The volume/tone control ground and power amp. ground are split by the PWB layout.*

PL6302 carries the digital I²C bus (SDA and SCL), by which the microprocessor controls IC6301. The broadcast FM or NICAM audio is selected by the NICAM decoder and tapped off through buffer circuits around TR6301 and TR6302 to the SCART output from PL6301 (output impedance 1k Ω - R6306, R6310).

The SCART input from PL6301 (into 10k Ω - R6301, R6302) and broadcast audio are fed to IC6301 which switches between them for output under microprocessor control. The IC generates pseudo stereo (not used), forced mono, spatial effect or full stereo. It applies bass, treble and volume control as per the table below. Left and right volume controls are independent allowing balance control.

	Cut	Boost	Step	Left cap.	Right cap.
Bass	-12dB	+15dB	3dB	C6323	C6309
Treble	-12dB	+12dB	3dB	C6324	C6310
Volume	-64dB	+ 6dB	2dB	(additional mute step to > -80dB)	

The inputs and outputs are capacitively coupled as the IC reference DC level may be present on pins.

Each output of IC6301 is fed to one '+' input of the differential power amplifier IC6303, left to pin 2, right to pin 3. The IC has internal gain limit feedback, but additional HF cut, to compensate for speaker response, is supplied by R6330/C6338 and R6331/C6339. This is to the '-' inputs on pins 8 (right) and 11 (left) from the output pins 12 (left) and 7 (right).

IC6303 has a built-in thermal shutdown, so good contact with the heatsink should be checked if the sound cuts out.

The outputs have HF snubber networks (R6315/C6320 and R6314/C6318) and coupling capacitors (CE6319/CE6317) to output sockets PL6305 and PL6304. The amplifier is designed for 8 Ω speakers and *CANNOT* be used with 4 Ω .

12.0 LIST OF COMPONENTS

Components which are marked \triangle in the parts list and on the circuit diagram are 'Safety Approved' types and should be replaced only with components supplied or approved by TATUNG Service Department. It is also recommended that components not marked with the safety symbol should be replaced with parts of the type originally fitted. This applies particularly to those resistors which Stand Off the printed circuit board, or have ventilation slots below them.

The manufacturer reserves the right to modify the design of the receiver, and to use or supply such alternative components as may be deemed necessary.

12.1 Resistors

The majority of resistors are either 0.125W, 0.25W, 0.4W or 0.5W +/-5% or 10% standard carbon or metal film types which are readily available from most component stockists. Replacements should be of the same rating and tolerance as the originals. Refer to the appropriate circuit diagram for values.

The resistors listed below should only be replaced with components approved or supplied by TATUNG Service Department.

Cct Ref.	Val.	Tol%	Watts	Type	Part No.
R411	33K	2	0.4	M/F	11-4062-0
R419	16K	2	0.4	M/F	11-3726-3
R438	200K	2	0.4	M/F	11-5212-2
\triangle R801	560K	5	0.5	M/Glaze	11-5333-1
\triangle R802	3R3	5	4.0	W/W 292-040 VTM	11-5448-6
\triangle R803,805	470K	5	0.5	M/Glaze	11-5318-8
\triangle R807,6130,					
\triangle R6136	10R	5	0.5	M/F Fl.Ret.	11-5292-0
R808	47R	10	6.0	W/W 308-3 VTM	11-5445-1
\triangle R819,820	4M7	5	0.5	M/Glaze	11-5471-0
R821	2K37	1	0.25	M/F	11-5218-1
R822	270R	1	0.25	M/F	11-5217-3
R824	10K	10	6.0	W/W 308-3 VTM	11-5447-3
\triangle R826	1R0	5	0.5	M/F Fusible	11-4268-2
R910-912,					
R917-919,					
R924-926	7K	2	0.5	M/F	11-5108-8
R932	470R	10	0.5	C/Comp	11-2715-2
R333-336	1K0	10	0.5	C/Comp	11-2621-0
R018,412	4K7	25	Pot Lin	PST MIN	12-3178-2
R403	47K	25	Pot Lin	PST MIN	12-3181-2
R416	220K	25	Pot Lin	PST MIN	12-3187-4
R444,					
R937-939	2K2	25	Pot Lin	PST MIN	12-3176-6
R817	2K2	20	Pot Lin		12-3201-0
\triangle R901				Thermistor Dual Positive	11-3569-4
\triangle R6314,5315	1R8	5	0.5	M/F Fl. Ret.	11-5373-0
\triangle R6131,6132	22R	5	0.5	M/F Fl. Ret.	11-5328-5
\triangle R423,940	22R	5	0.5	M/F Fusible	11-4803-6
\triangle R433	0R68	5	0.5	M/F Fl. Ret.	11-5294-7
\triangle R448	0R33	10	0.5	M/F Fusible	11-5025-1

12.2 Capacitors

The majority of capacitors used are standard off-the-shelf items. Refer to the circuit diagram for values. Replacements must be of the same tolerance and rating as the originals.

Key to Type Codes:

Metalized Polyester - MP, Polypropylene - PP, Polyester - P, Metalized Polypropylene - MPP, Ceramic Plate - C, Polystyrene - PS, Electrolytic - E, Ceramic Disc - CD, Metalized Polystyrene - MPS, Tubular Ceramic - TC.

Cct Ref.	Val.	Tol%	Volts	Type	Part No.
C005,585	2n2	-20+80	63	CP	14-6898-7
C011-013, C021,022, C018,504, C6101-6103, C6114,6121, C6143,6149	10n	-20+80	63	CP	14-6892-8
C016	15p	2	50	CP NPO	14-7053-8
C020,503, C514,554	22n	-20+80	63	CP	14-6911-8
C314-316	22p	5	50	CP N150	14-6885-5
C401	2n2	10	50	TC	14-6358-6
C6324, C410,6310	4n7	10	100	CP	14-6894-4
C412	2n7	1	160	PS	14-5818-3
C415,6107, C6119	22n	30	16	TC	14-6813-8
C419	10n	20	400	P	14-6838-3
⚠C420	7n5	5	2kV	PP	14-6917-7
C6322, C421,6321	15n	20	400	MP	14-6933-9
⚠C422, ⚠C803-806	1n	20	250VAC	CP	14-6937-1
C423	330n	5	250	MP	14-5833-7
C424,818	47μ	20	250VDC	Low ESR	14-6992-4
C434	22μ	20	250	E	14-6822-7
C501,558, C559,6108, C6109	100p	2	50	CP N150	14-6884-7
C510,513, C6113,814, C6122,6123	1n	10	100	CP	14-6934-7
C525,526	82p	2	100	CP NPO	14-7109-0
C556,557, C566,567	10n	-20+50	100	CP	14-6903-7
C579	18p	2	50	CP NPO	14-7014-0

C6309,6840,						
C6338,6339,						
C586,905	33n	20	250	MP		14-6840-5
C6110,6111	33p	5	50	CP NPO		14-6887-1
C6115,6124						
C6137,6140	330p	2	50	CP N750		14-7030-2
C6116	150p	5	50	CP N150		14-6912-6
C6117	150p	10	50	TC		14-7100-7
C6127,6130,						
C6132,6138	100n	20	50	RPE132		14-7093-0
C6136,6139	68p	2	50	CP NPO		14-7012-4
C6145,6148	2μ2	20	50	E Non Pol		14-7125-2
C709	220p	2	50	CP N470		14-7092-2
△C801	220n	10	250	MP-KT		14-7132-5
C809	6n8	10	100	P		14-7128-7
△C811	3n3	20	400VAC	R12.5		14-6977-0
C812	33n	10	1KV	PP		14-6991-6
△C813	1n5	5	1.5KV	MPP		14-6649-6
C830	1n5	10	100	CP		14-6945-2
C901	270p	10	50	TC		14-6559-7
C902,903	220p	10	50	TC		14-6815-4
△C904	10n	-20+50	2KV	CD		14-6954-1
CE807	220μ	20	385	E		14-7108-2

12.3 Diodes

Cct Ref.	Description	Part No.
D401,814	1N4003GP	19-6405-4
D402	BY133GP	19-8144-7
D403,808	BYD33M	19-8393-8
D404	BYD73F	19-8416-0
D406,551-554,6103,702,		
D707,816,817	1N4148	19-3992-0
D501	Zener BZX79 8V2 5% 400mW	19-8539-6
D6101	Varicap BB405	19-8518-3
D6102	Varicap BB809	19-8406-3
D711	LED Red	19-8504-3
D714	LED Yellow	19-8507-8
D716	BAT85 Schottky	19-8163-3
D801-804	BY127	19-4636-6
D805	RGP15M	19-8340-7
D806,815	BYD33G	19-8388-1
D809,810	BY229-200	19-8310-5
D811	BYD73D Philips	19-8376-8
D818	C6V2 5% 350mW V-reg	19-8033-5

12.4 Integrated Circuits

Cct Ref.	Description	Part No.
IC001	Zener diode 33V, 2%, 345mW	19-8582-5
IC011	TDA8349/N3 Philips	19-8495-0
IC301	SAA5246P/E Philips	19-8457-8
IC302	CMOS SRAM 8kx8 100/150ns	19-8580-9
	Alternative CMOS SRAM 8kx8 150ns	19-8512-4

Cct Ref.	Description	Part No.
IC303	TEA5114A	19-8292-3
IC401	TDA2579A	19-8259-1
IC402	TDA3653B	19-8387-3
IC501	TDA8453 Philips	19-8453-5
IC502	TEA2014A	19-8291-5
IC551	TDA8451A/N2	19-8454-3
IC552	TDA8466N2	19-8607-4
IC611	TDA4482 Telefunken	19-8517-5
IC6101	TDA8732 Philips	19-8515-9
IC6102	SAA7282 Philips	19-8675-9
IC6301	TDA8425 Philips	19-8682-1
IC6302	Regulator +12V, 1A, T0220	19-6813-0
IC6303	TA8211AH Toshiba	19-8684-8
IC701	P83CL168-014 Philips	19-8692-9
IC703	NMOS EEPROM 256 Byte	19-8447-0
IC704	TFMS5360 Telefunken	19-8656-2
IC801	TDA4605	19-8329-6
-	Alternative GL8905 Goldstar	19-8706-2
IC802	LM317T	19-8264-8
IC803	Regulator +5V, 0.5A, T0220	19-8333-4

12.5 Transistors

Cct Ref.	Description	Part No.
TR301	PH2369	19-8324-5
TR401,404,405,407,501, TR502,505,506,6101,6103 TR6104,6106,612,704-707, TR802,6301,6302,302	NPN General purpose	19-8145-5
TR402	BC337	19-8149-8
TR403	S2000AF	19-8261-3
-	Alternative BU2508AF	19-8566-3
TR503,611	BC547C	19-8164-1
TR504,6105,6107, TR702,303	PNP General purpose	19-8146-3
TR701	PH2369	19-8324-5
TR901-903	BF787	19-2122-9

12.6 Chokes and Coils

Cct Ref.	Description	Part No.
L001	Choke 33 μ H 10%	15-7557-0
L002,503,504,6101	Choke 10 μ H 10%	15-7652-6
L011	Coil demodulator 38.9MHz	87-0143-1-003
L401	Choke 10 μ H 10%	15-7528-7
L405,406,801	Choke 22 μ H	85-1118-7
L407	Coil Line Lin/width	85-9792-8
L501,502	Choke 22 μ H 10%	15-7707-7
L6102,6103	Choke 1MHz 10%	15-7671-2
L612	Stereo sound detector	85-9830-4
L701	Choke 10 μ H (High current)	85-1753-3

12.7 Transformers

Cct Ref.	Description	Part No.
T401	Line Drive	85-9986-6
△T402	Flyback	15-7839-1
△T801	SMPSU	87-0241-1-001

12.8 Crystals, Filters and Delay Lines

Cct Ref.	Description	Part No.
XL551	Xtal 4.433619 (20pf) PR	16-1935-7
XL6101	Xtal 13.104MHz (15pf) PR	16-1931-4
XL6102	Xtal 8.192MHz (30pf)	16-1937-3
XL701	Resonator ceramic 12MHz	15-7715-8
FL011	Filter Saw OFWJ3351 Siemens	15-7734-4
FL6101	Filter 6.552MHz	15-7822-7
FL613	Filter ceramic 6.0MHz	15-6981-3
△FL801	Choke Mains filter 2X30MHz, 1A	15-7785-9

12.9 Miscellaneous

Cct Ref.	Description	Part No.
-	△21" CRT A51AEZ90X02(VW) CPT	18-1059-6
-	△Coil Degaussing 21"	87-0048-6-003
-	△CRT Base Socket Narrow Neck	25-2066-4
-	PWB Bracket Clamp	83-3933-3/29800
-	PWB Securing Pillar	83-3934-1/29800
-	Wiring Harness Tube Base	83-4892-8-003
-	Spacer (Infra-red RX)	83-5449-9-001
FB801	Ferrite bead 4S2 8x1.5x10mm	15-7578-3
△FS801	Fuse Timelag 2A	21-2626-5
△-	Alternative fuse	21-3685-6
△-	Fuse holder DE611/01	21-3712-7
SK501	SCART 21 way connector	22-8267-4
TU001	Tuner UHF 3200 PEC 3X0 851	21-3738-0
-	Alternative Tuner FL2177/84	21-3730-5
-	Front Moulded CX5	83-4446-9-001
-	△Back cover 21CX5 stereo	83-4447-7-002
-	L/Speaker 4" RD 8R 10W	21-3731-3
-	Hinge RH nylon	83-3977-5/50100
-	Hinge LH nylon	83-3976-7/50100
-	Prism	83-4290-3
-	Prism	83-4315-2
-	Knob On/Off	83-4469-8-001
-	Spring	83-1985-5
-	Ejector mechanism	80-0200-2
-	Door CX5	83-4472-8-001
-	△Rail Chassis support LH	83-3688-1/10000
-	△Rail Chassis support RH	83-3686-5/10000
-	△Lead Mains 13A plug 5A fuse	22-8424-3
-	△Alternative Mains Lead	22-8435-9
-	Foot rubber white	83-5020-5-002
△S801	Switch On/Off	20-4081-6

12-10 Remote Control Hand Unit

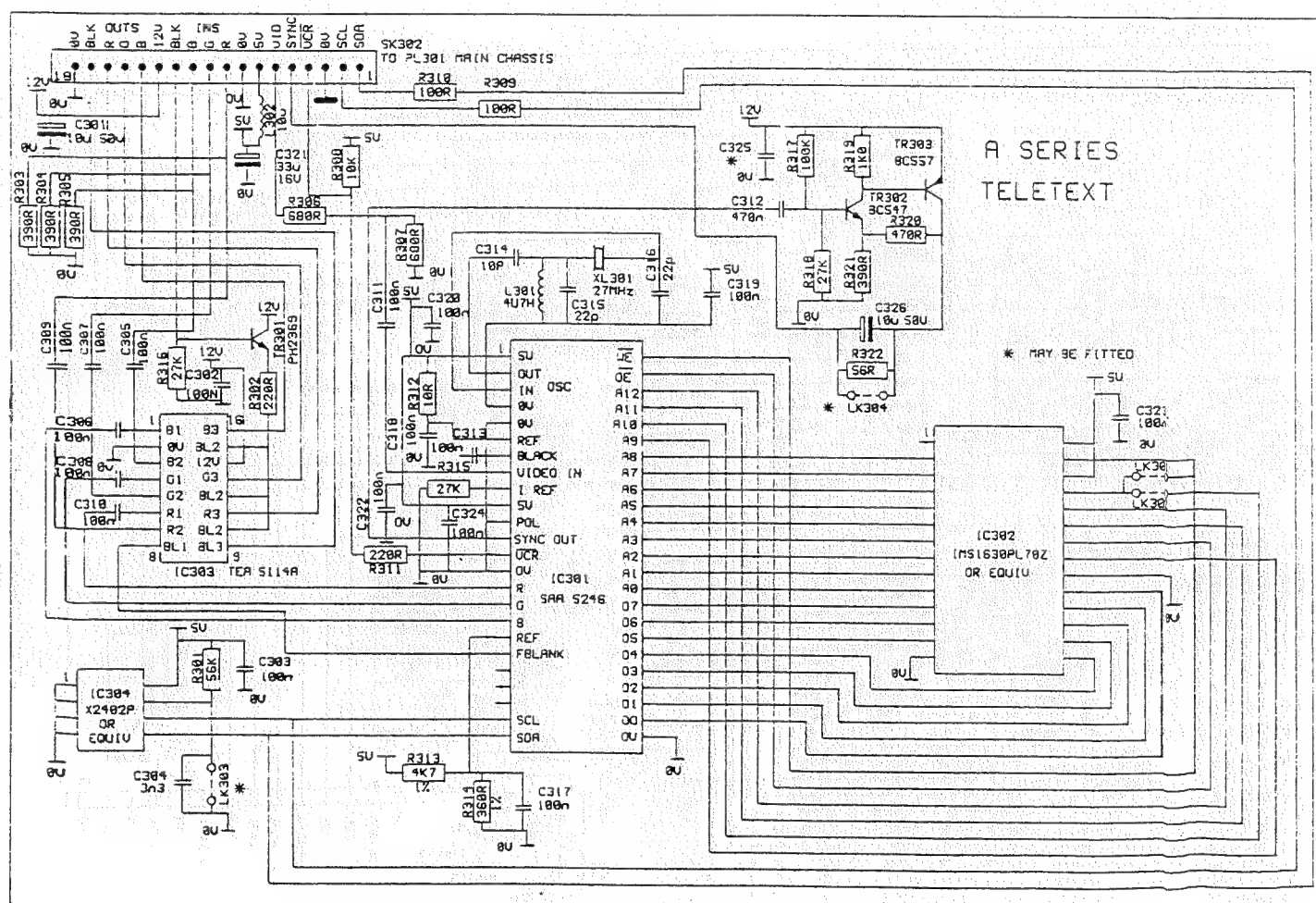
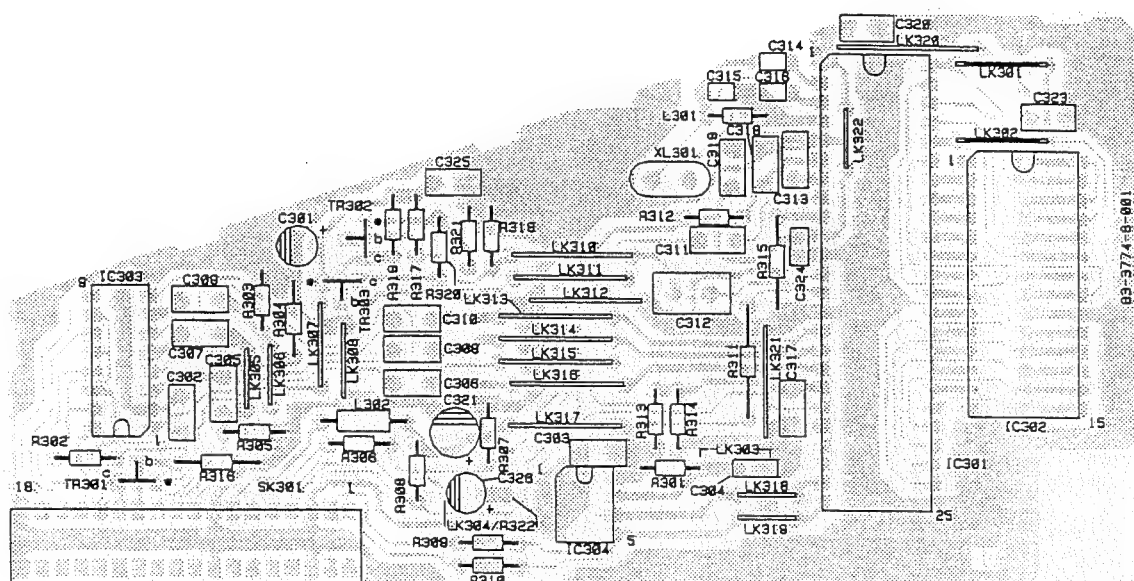
Cct Ref.	Description	Part No.
IC781	SAA3010P	19-8485-3
TR781	BC368	19-8283-4
XL781	Resonator Ceramic 429KHz	15-7720-4
D781	IR Emitter TLN115A	19-8282-6
-	Alternative IR Emitter	19-8709-7
-	Contact double AAA battery	85-4063-2
-	Contact single	83-2161-2
-	Screw T/F plastic 2.5 x 6 BLT	41-1457-4
-	Top Cover	83-2052-7/20100
-	Base Cover	83-2053-5/20100
-	Battery Cover	83-2094-2/20100
-	Membrane all buttons	83-2099-3/160100
-	Escutcheon FXA	83-3276-2/130140
-	Complete R/C Hand Unit FXA	01-0224-5

12.11 Complete Assemblies

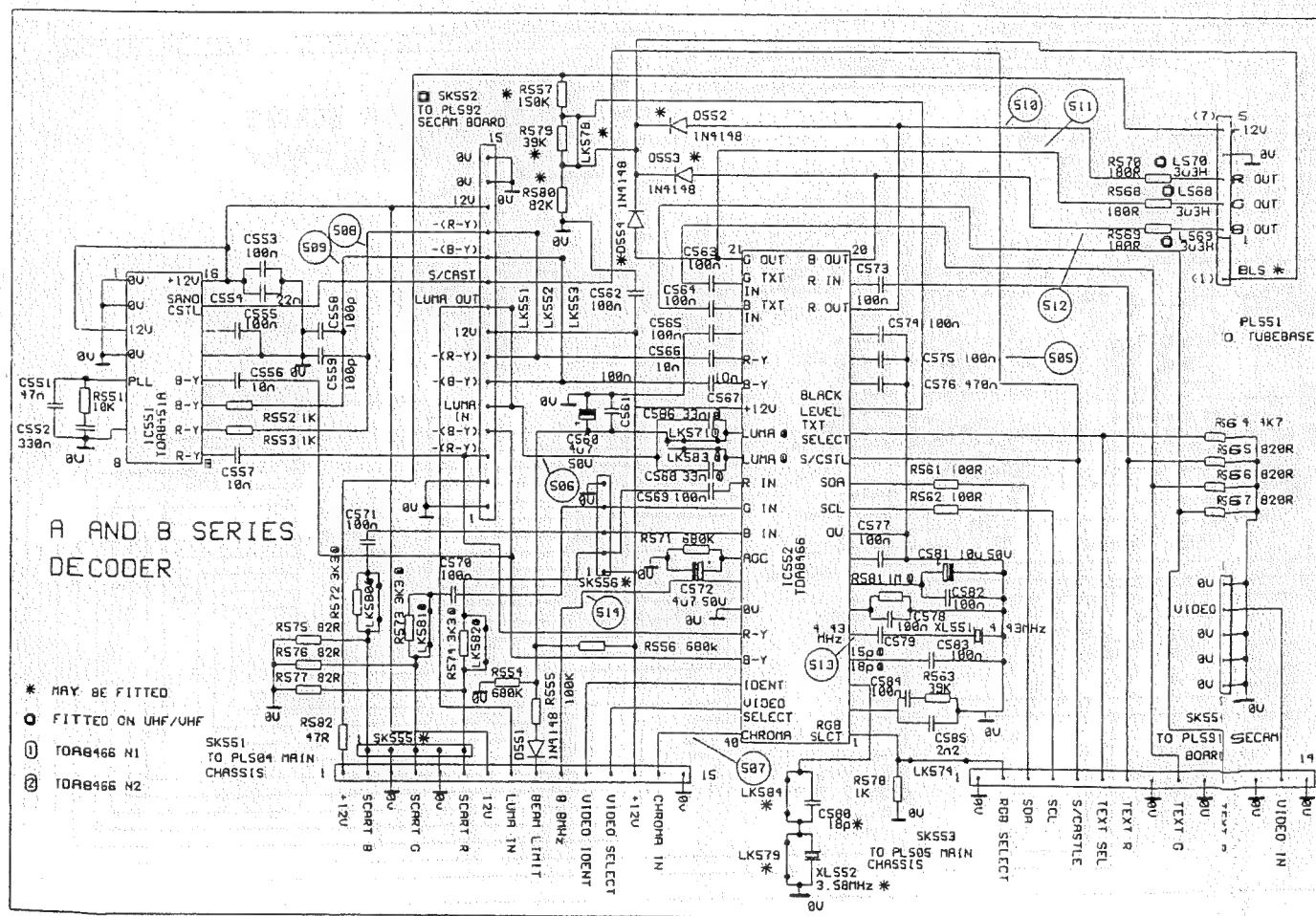
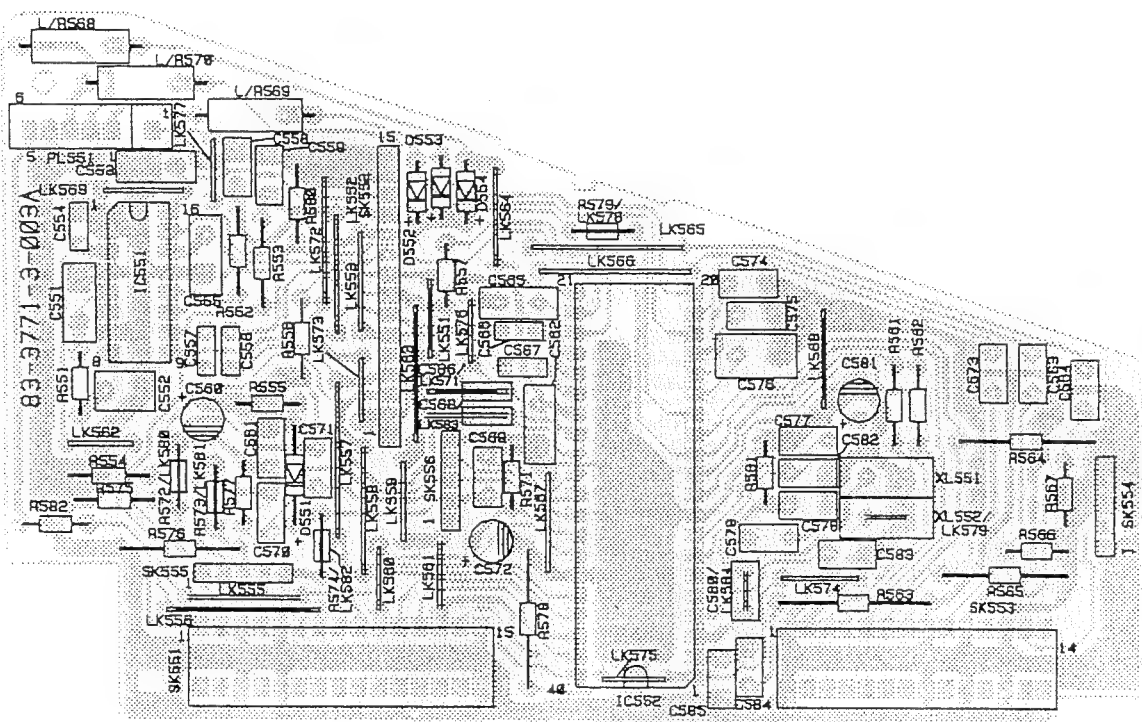
-	Stereo Power Amp PWB	01-0814-6
-	Fastext Module PWB	01-0135-4
-	Main Chassis PWB	01-0760-3 *
-	Decoder Module	01-0134-6
-	Tubebase Narrow Neck	01-0148-6
-	IF Module	01-0178-8
-	NICAM Decoder PWB	01-0724-7

* Main chassis includes the assemblies listed below it.

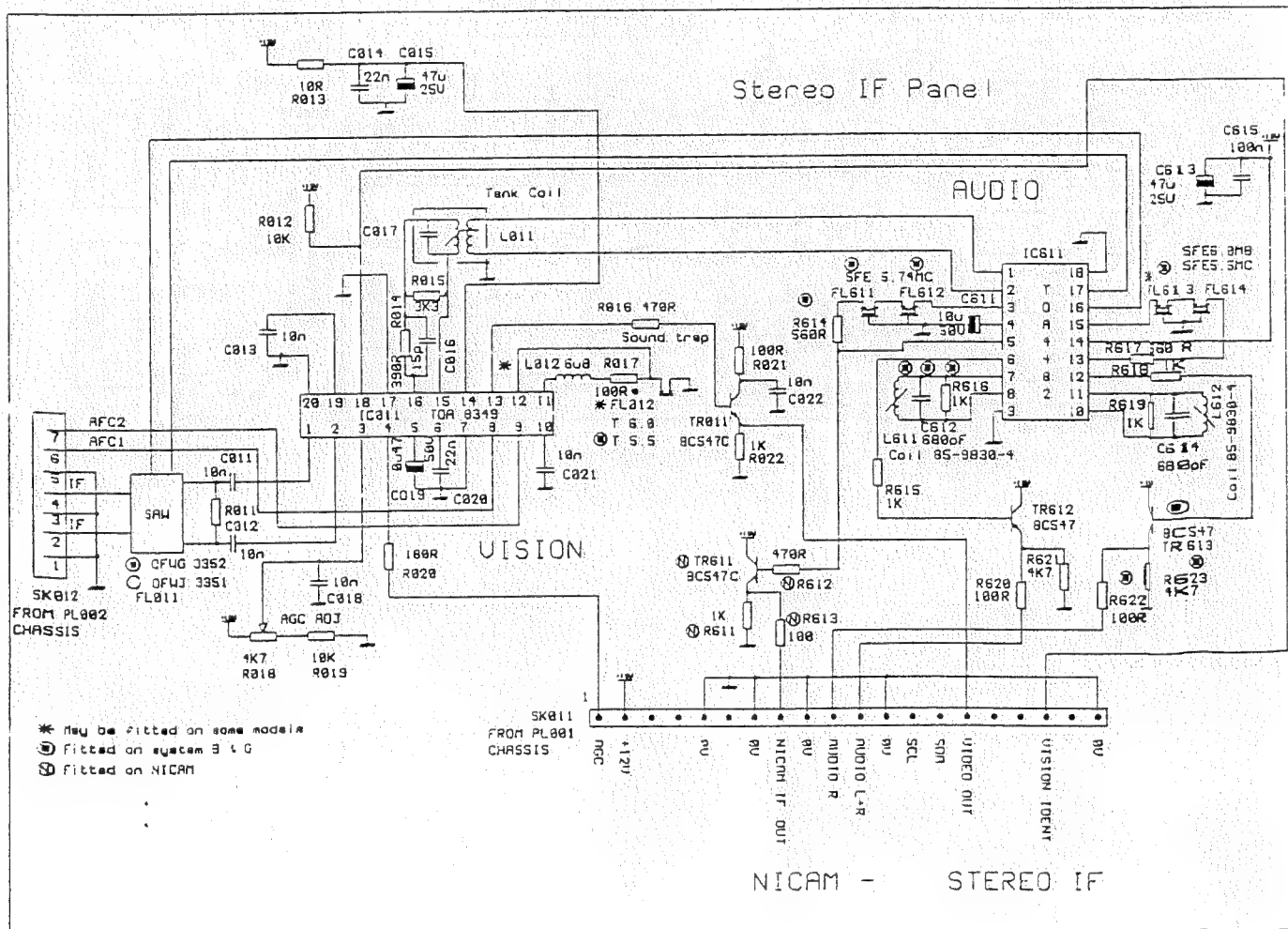
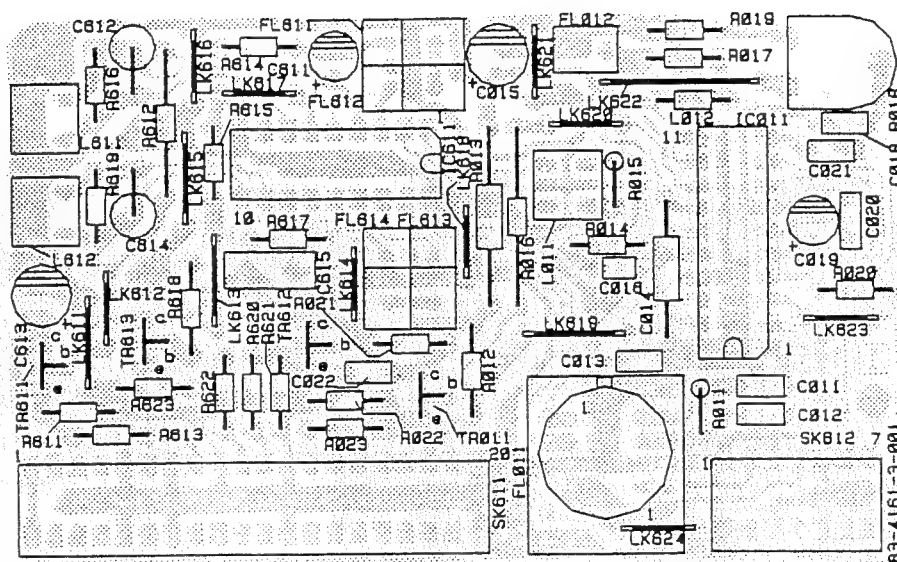
13.1 Teletext Decoder PWB and Circuit Diagram



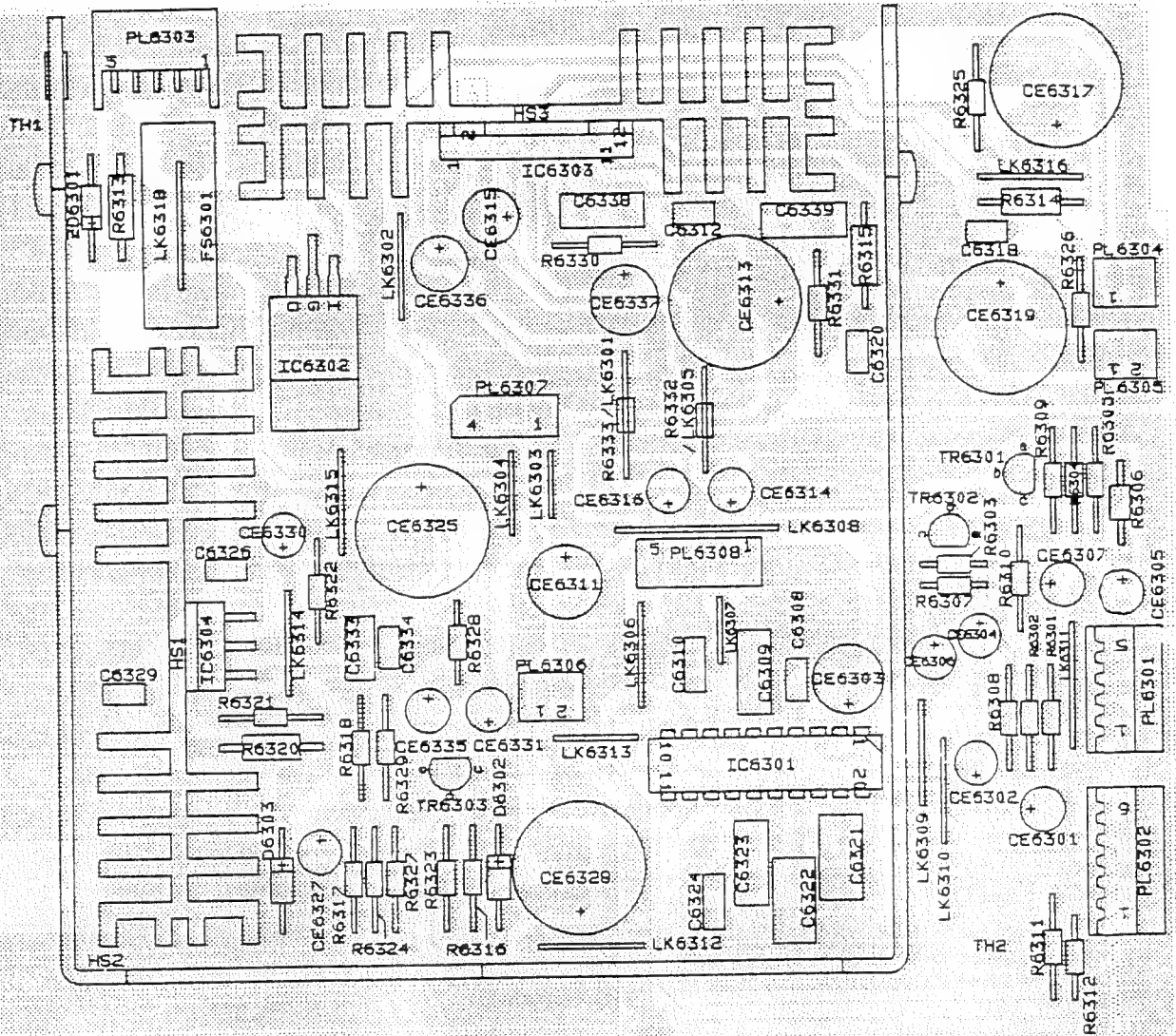
13.2 Colour Decoder PWB and Circuit Diagram



13.3 IF Module PWB and Circuit Diagram



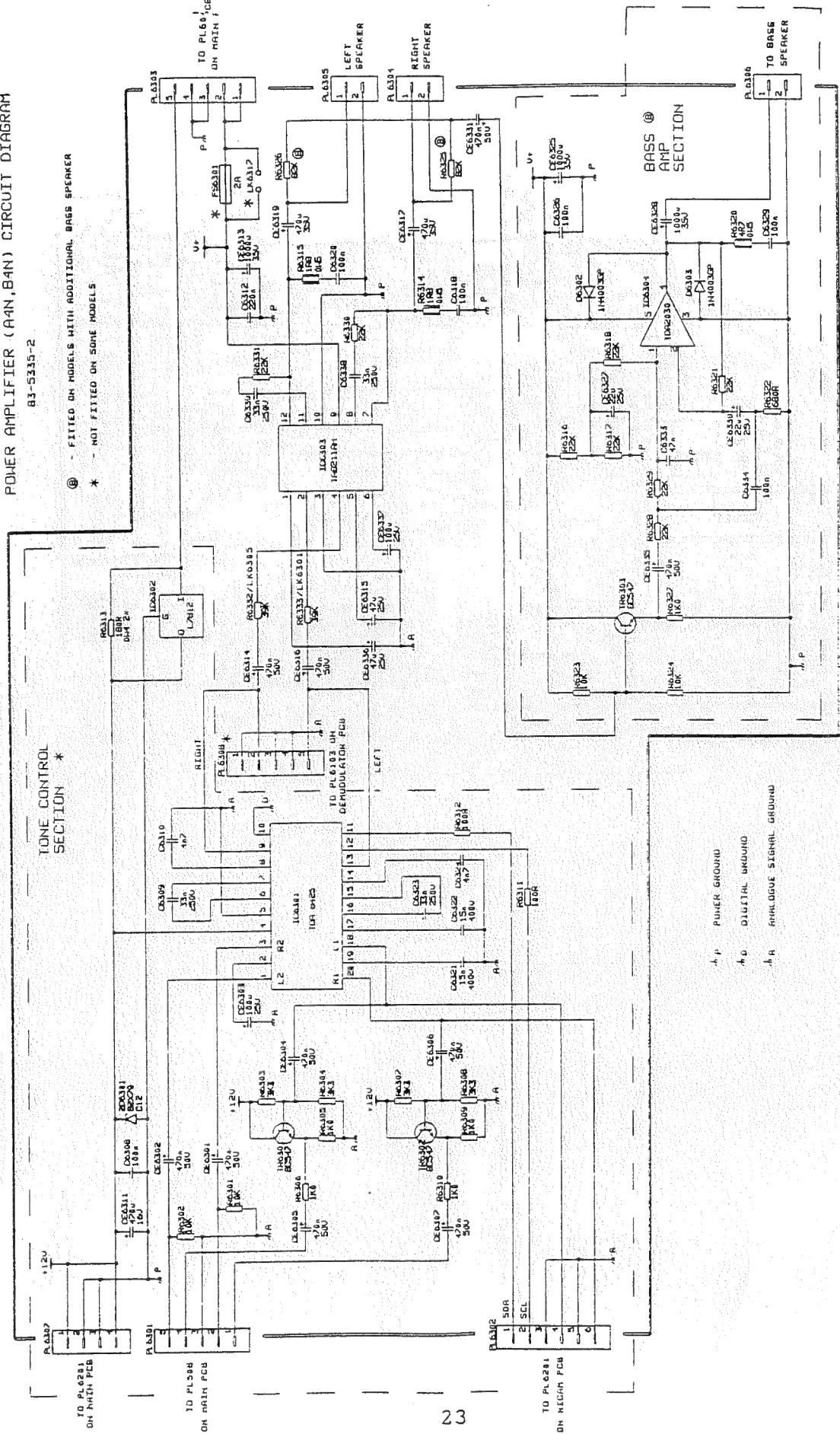
13.4 Power Amplifier PWB



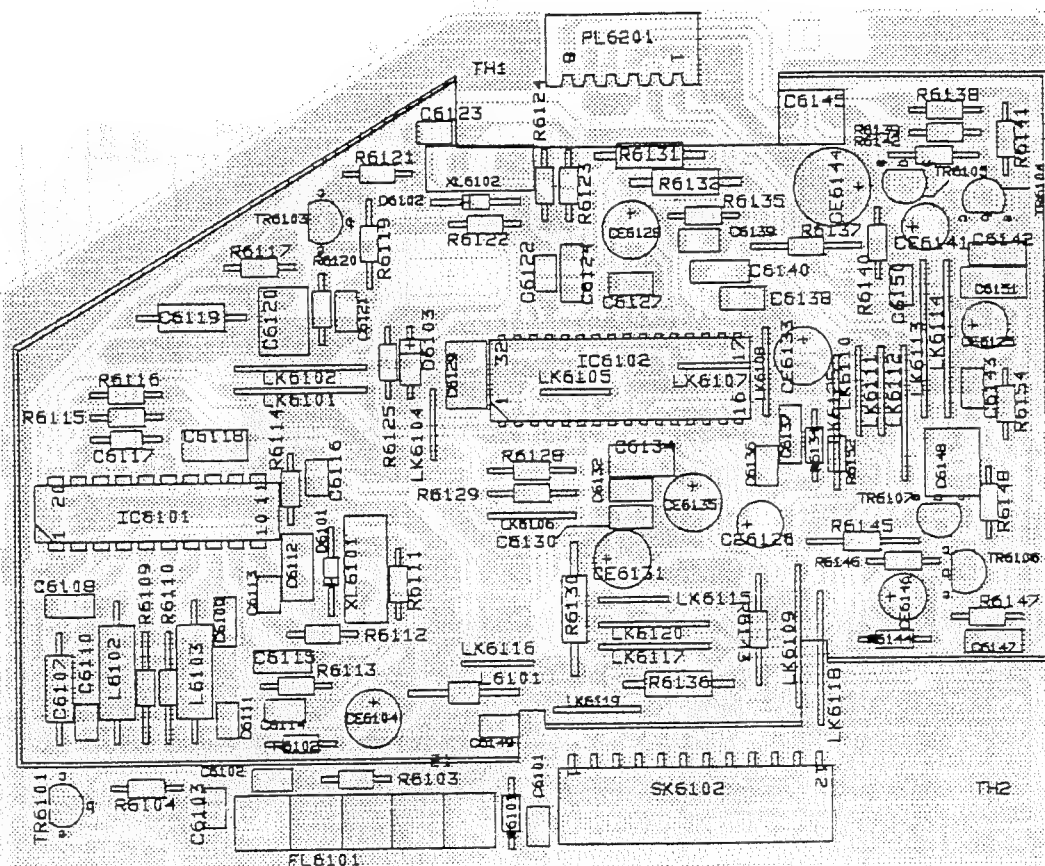
13.5 Power Amplifier Circuit Diagram

POWER AMPLIFIER (A4N,B4N) CIRCUIT DIAGRAM

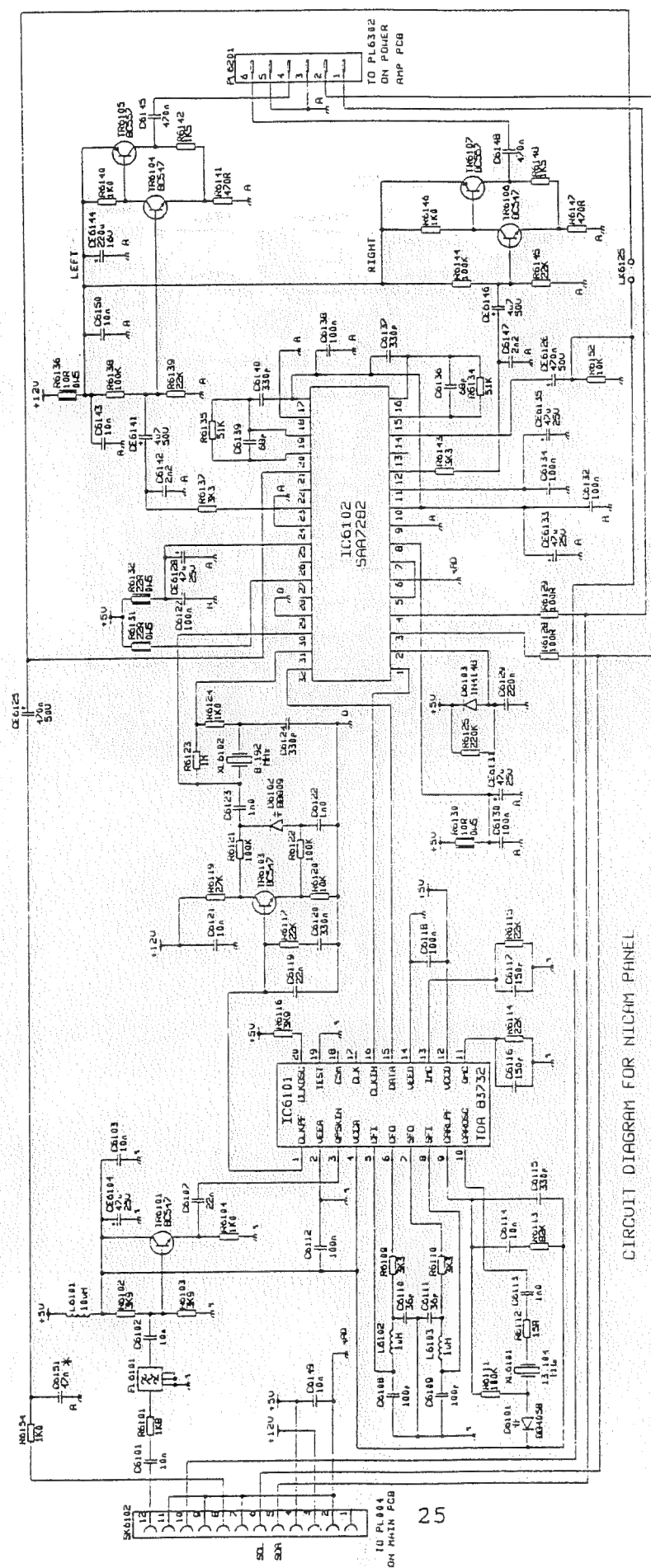
(B) - FITTED ON MODELS WITH ADDITIONAL BASS SPEAKER
 * - NOT FITTED ON SOME MODELS



13.6 NICAM Decoder PWB



13.7 NICAM Decoder Circuit Diagram

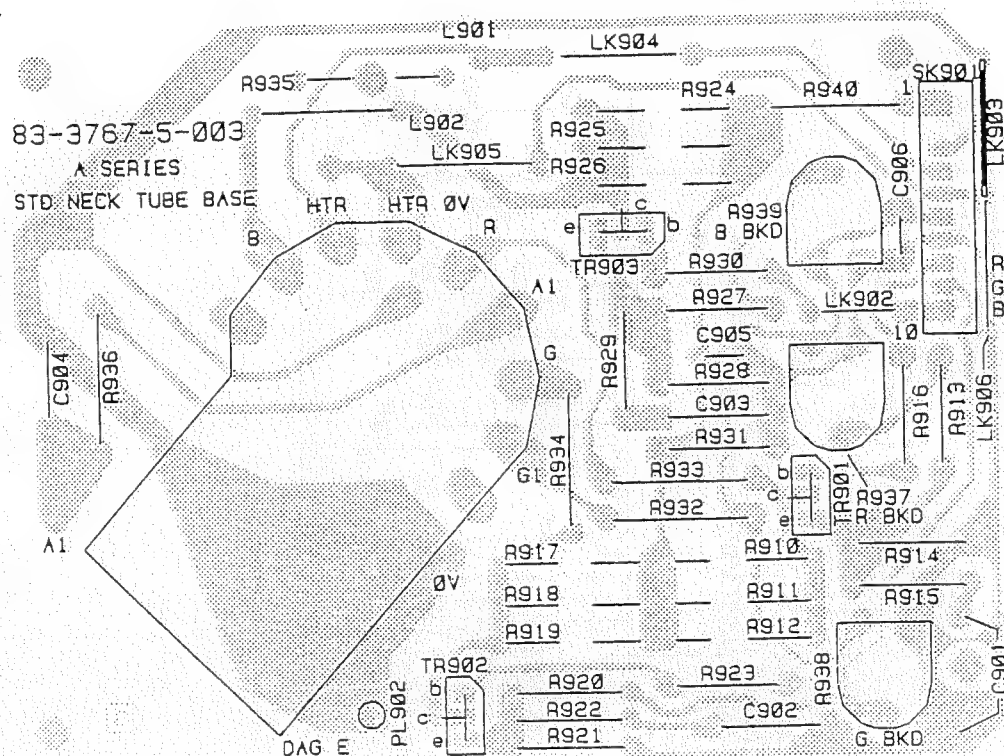


CIRCUIT DIAGRAM FOR NUCAM PANEL

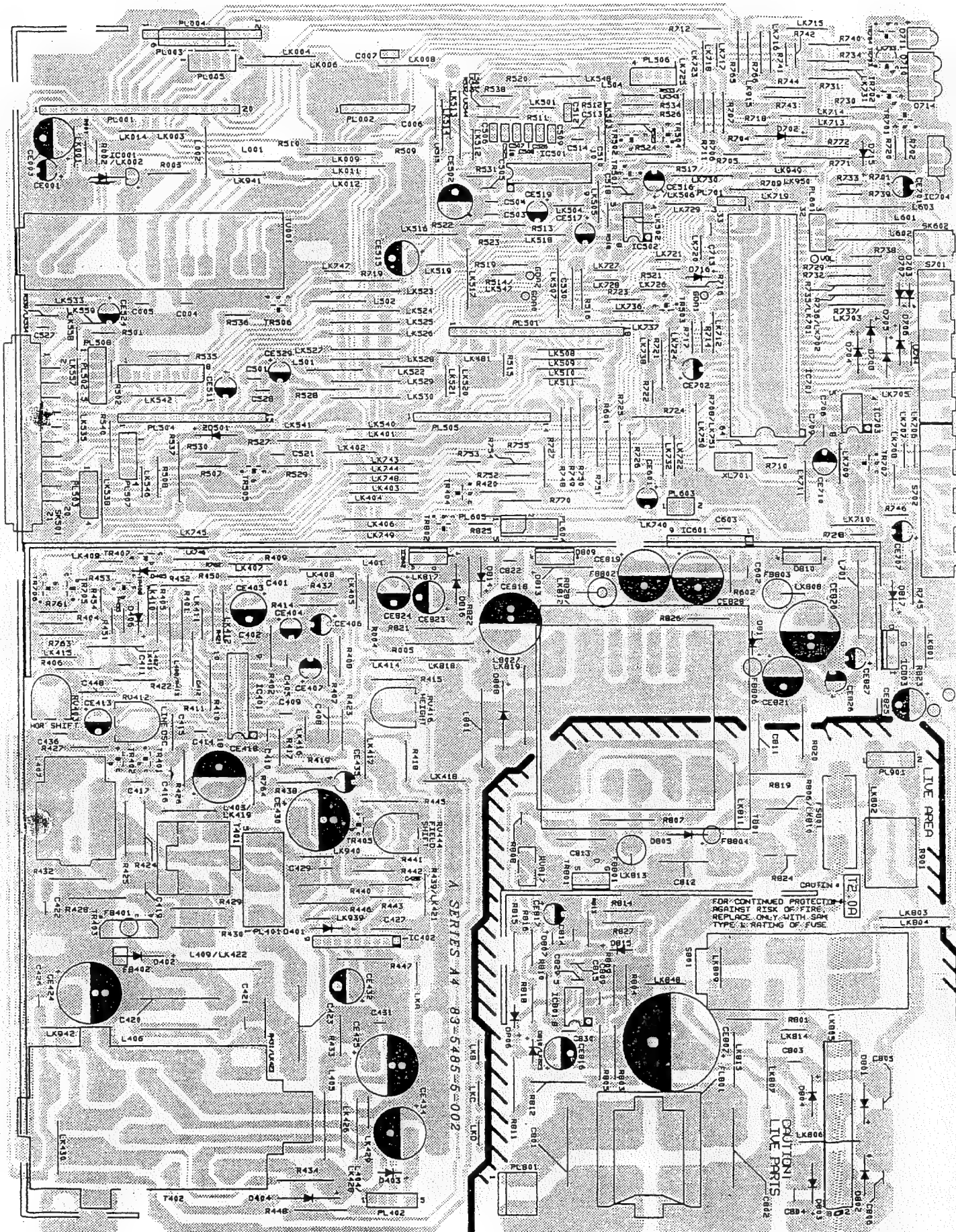
U3-5334-4

* - NOT FLICED WHEN IL6204 (MC44130) IS USED

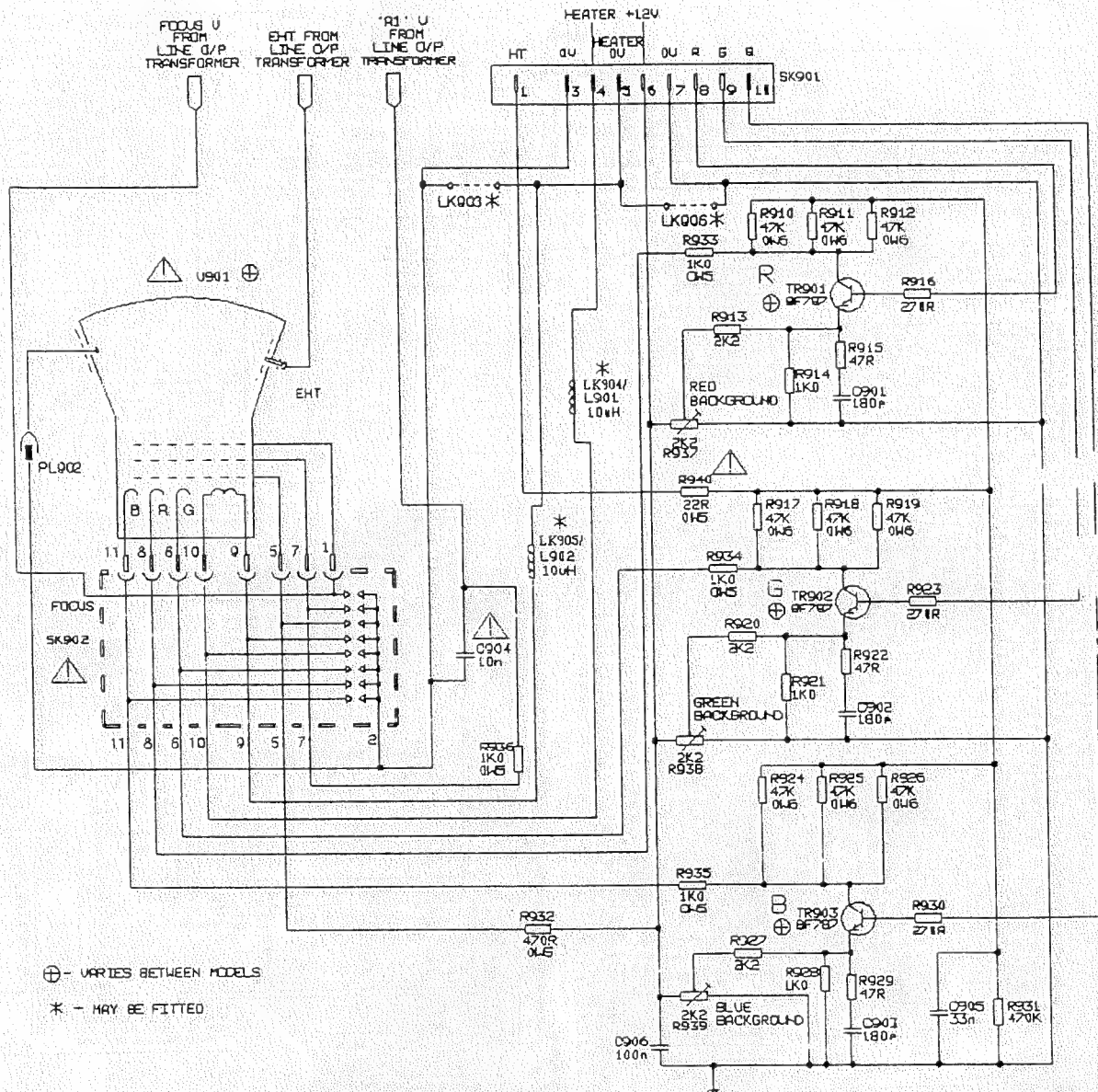
13.8 Tube Base (Narrow Neck) PWB



13.10 Main Chassis PWB

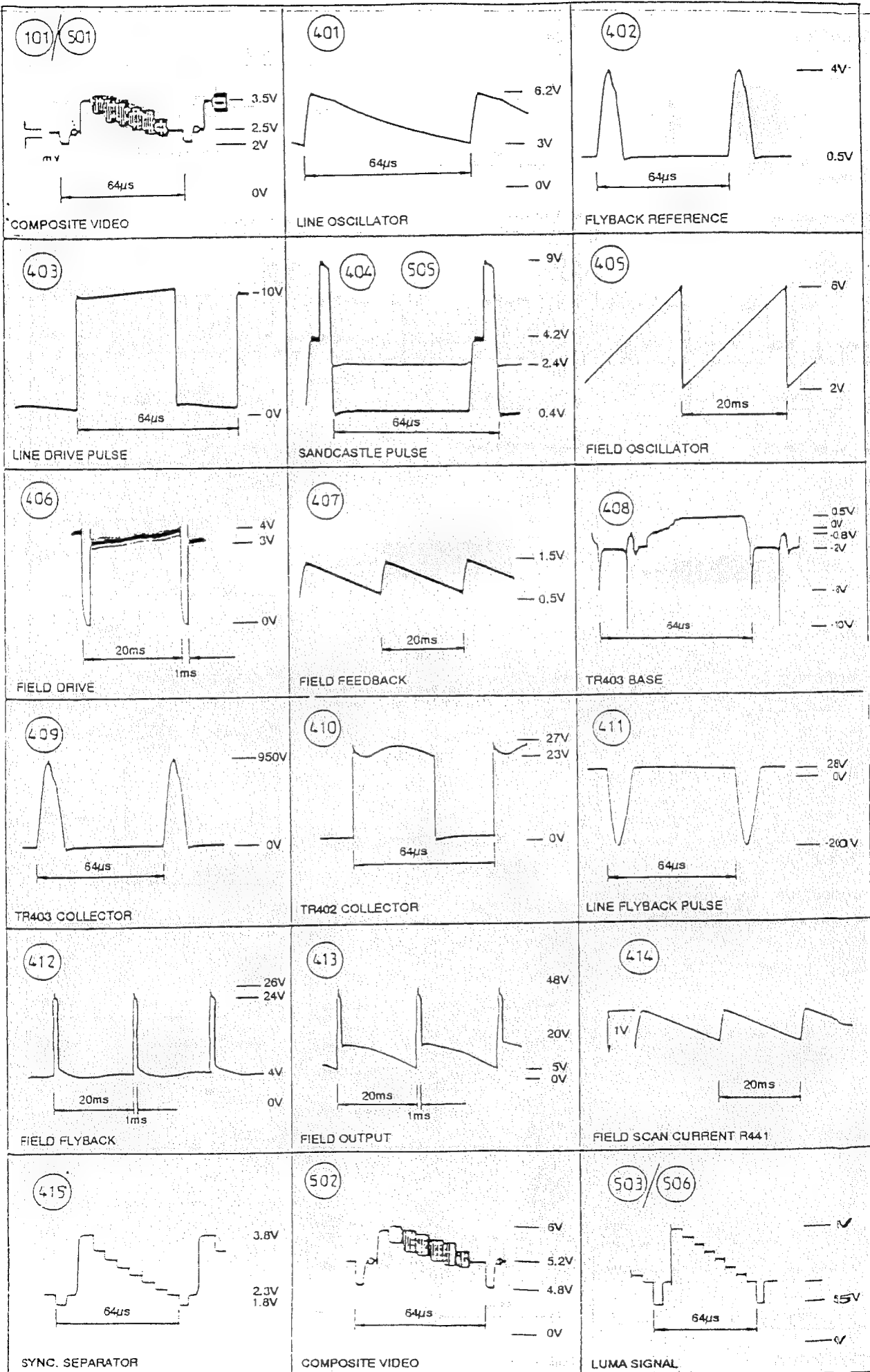


13.9 Tube Base (Narrow Neck) Circuit Diagram

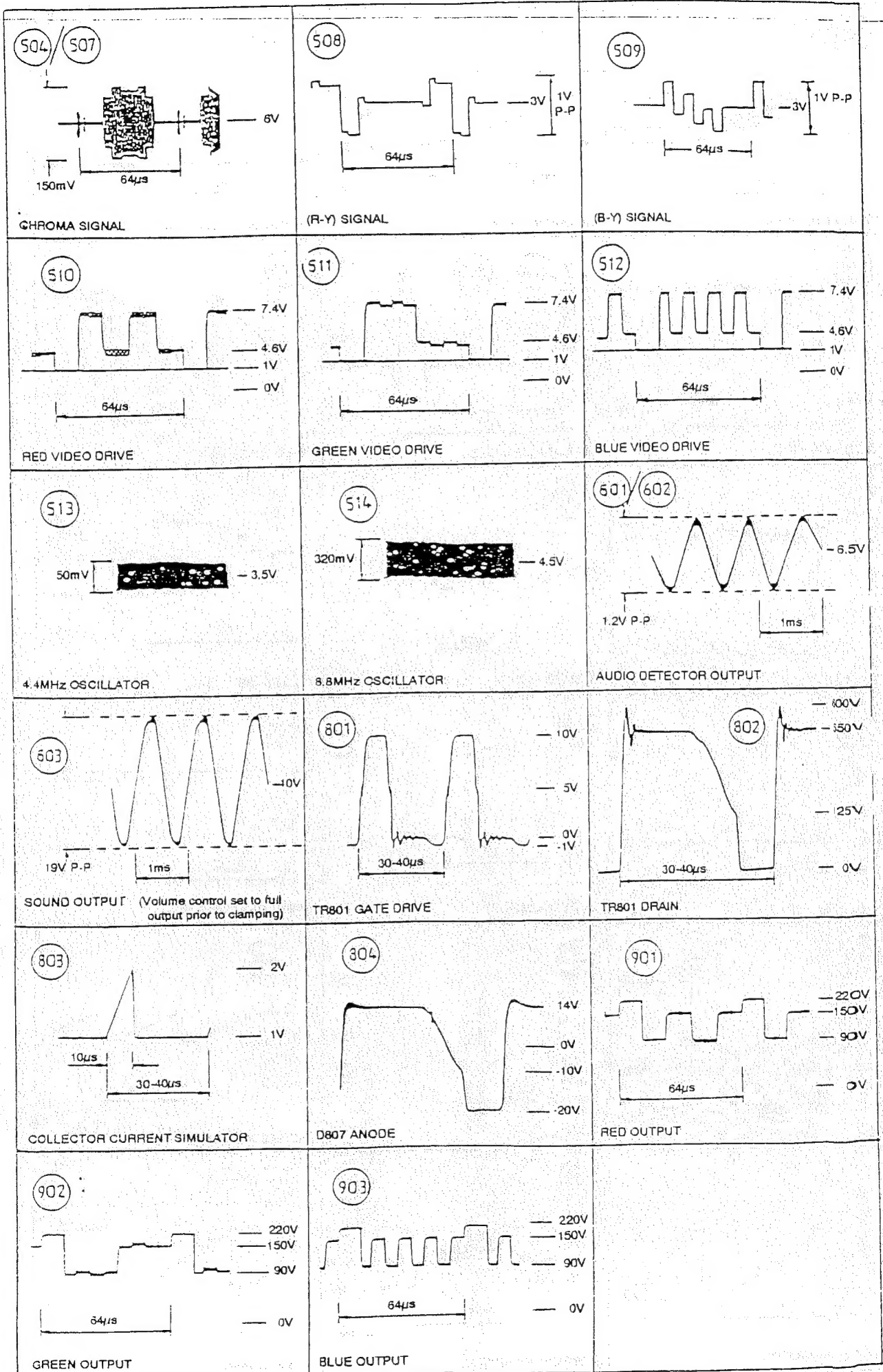


A SERIES TUBE BASE PANEL
NARROW NECK CRT

Section 14.0 Waveforms



Waveforms



Section 15.0 Adjustments/Locations

15.1 Adjustment locations Main Chassis

T402 Focus (top)

T402 A1 (bottom)

RV403 Horizontal Shift

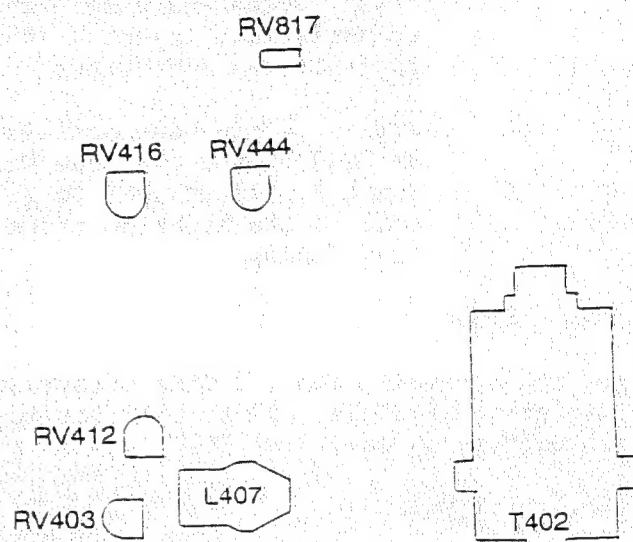
L407 Width/Linearity

RV412 Line Oscillator

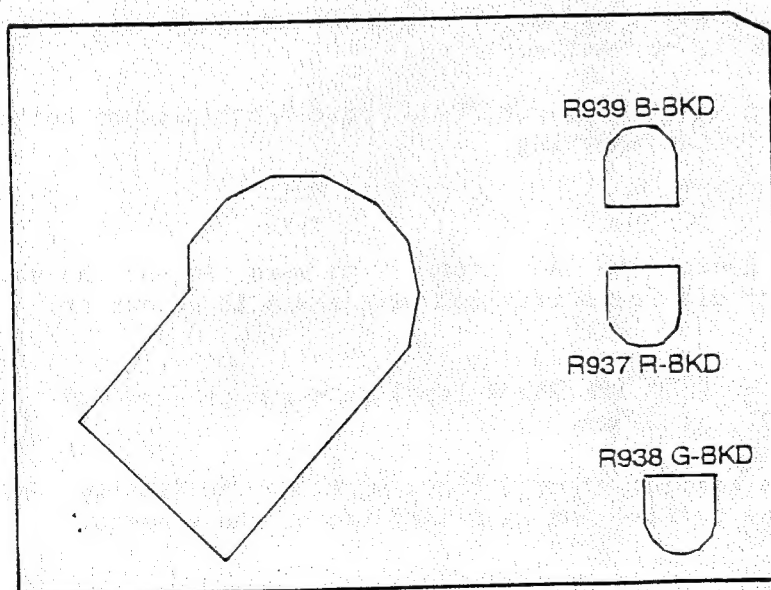
RV416 Height

RV444 Field Shift

RV817 Set H.T.



15.2 Adjustment locations Tube Base



15.3 H.T.Set

With the receiver locked to a normal picture signal, reduce the brightness and contrast to minimum, i.e. zero beam current. Connect a suitable voltmeter across CE818 and adjust RV817 for a reading of 115v dc.

15.4 Vision

- a) Tuner IF AGC - With 10 mV RF signal (no sound carrier) applied, monitor the tuner output with an oscilloscope having a bandwidth equal to or greater than 50MHz and adjust RV018 for 1.2V pk-pk signal.
- b) AFC/Detector Coil Alignment - remove any connection to the aerial input socket and ensure that the receiver is not tuned to a strong transmission, Inject a 100mV IF carrier signal (39.06MHz) into the input of the SAW filter.

With a double beam oscilloscope monitor the logic levels on PL002 pin 6 (On Tune Window) and pin 7 (High/Low Tuning), adjust L011 to give pin 6 logic high and pin 7 near to the high/low transition in the centre of the On Tune Window.

15.5 Sound

Inject a signal with a 6.0MHz offset sound carrier modulated at 1kHz at a deviation of 27kHz. Adjust L612 for maximum recovered audio with minimum distortion on pin 11 of PL001.

15.6 Timebase

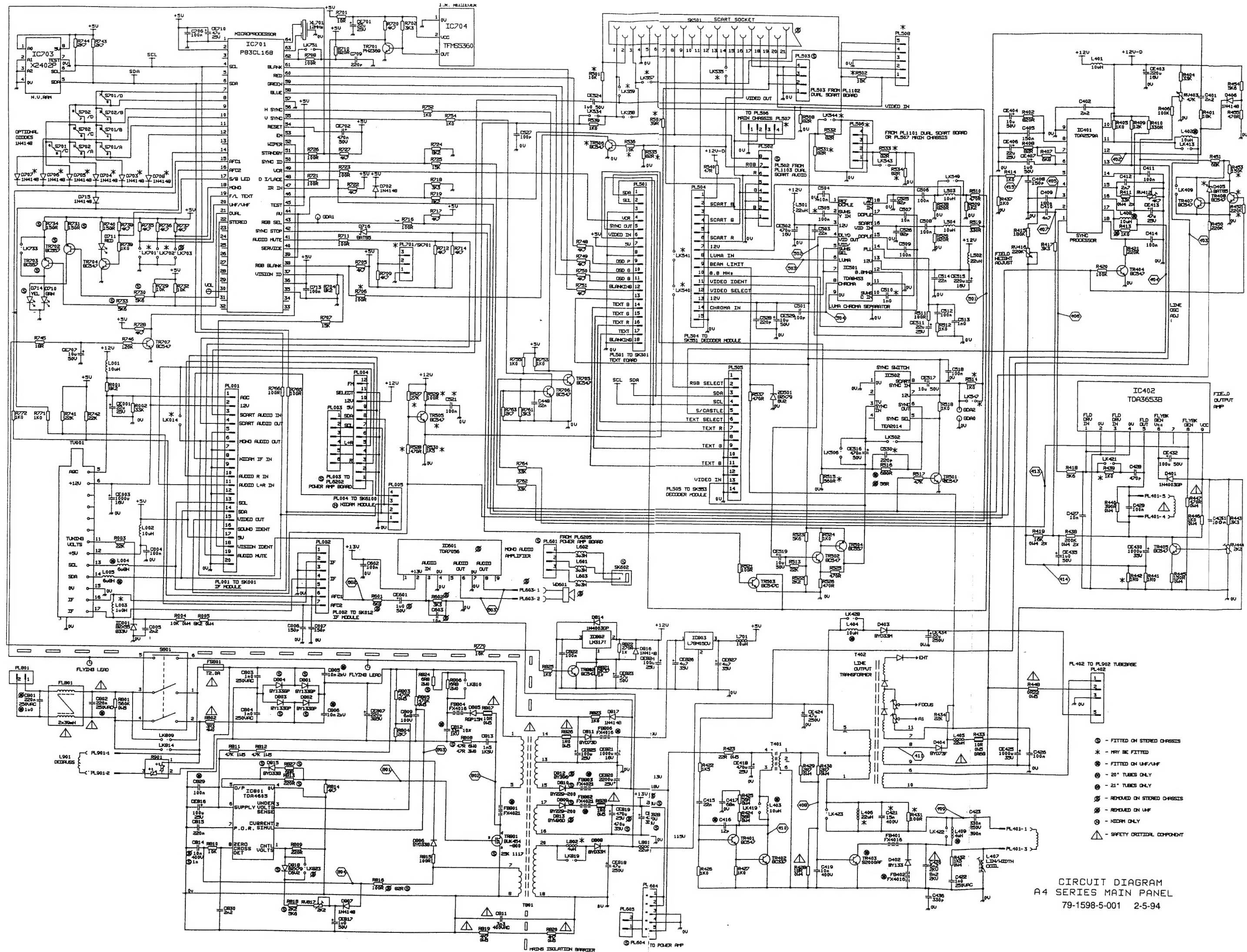
- a). Line Frequency - With an aerial signal of 3-10mV short out pin 5 of IC401 to 0V. Adjust RV412 for a stable, or as slow rolling as possible, picture on screen
- b). Line width and phase - Adjust L407 for correct line linearity and width and RV403 for correct centring.
- c). Field height and shift - Adjust RV416 for correct picture height and RV444 for correct centring.

15.7 R,G,B

(R, G and B Backgrounds) - Reduce the A1 control to zero. Adjust the user Brightness and Contrast controls for normalized settings with Colour at minimum.

Adjust R937, R938 and R939 so that the Black Level measured at each CRT cathode (R933, R934 and R935) is +160V.

Increase the A1 control for correct overall Black Level on the display. Grey-scale corrections may now be carried out with only two of the presets.



CIRCUIT DIAGRAM
A4 SERIES MAIN PANEL
79-1598-5-001 2-5-94